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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Inventors: Y. MARUWAKA et al. Art Unit: 2631

Application No.: 09/820,636

Filed: March 30, 2001

For: RATE MATCHING CALCULATION METHOD AND RATE MATCHING APPARATUS

PETITION TO MAKE SPECIAL

Assistant Commissioner of Patents
Washington, DC 20231

URGENT

Sir:

The Applicants respectfully petition that the above-captioned application be granted special status. The requirements of MPEP section 708.02(VIII) are complied with as follows:

(1) Please charge the petition fee set forth in 37 CFR 1.17(i) to Deposit Account No. 19-4375.

(2) All pending claims (original claims 1-10, new claims 11-16 added in the Preliminary Amendment of March 30, 2001 and new claims 17 and 18 added in the Preliminary amendment of November 27, 2002) are believed to be directed to a single invention; if the Office determines that all the claims presented are not obviously directed to a single invention, the Applicants agree to make an election without traverse as a prerequisite to the grant of special status.

(3) A pre-examination search was made and the field of search is as follows:

Class 375, subclasses 295, 296, 346 and 347; and

Class 714, subclasses 701, 704, 774 and 790.

Examiners Albert Decady and Stephen Baker were consulted for the filed of search.

A further pre-examination search was made in the form of a Partial European Search Report dated March 27, 2003; an Information Disclosure Statement directed thereto was filed on April 18, 2003. A further Information Disclosure Statement was filed on July 2, 2001, directed to art cited in the present specification.

(4) One copy each of the prior art deemed most closely related to the subject matter encompassed by the claims is of record in the form of the art cited in the Information Disclosure Statement filed March 7, 2002.

(5) The following is a detailed discussion of the art cited in the above-mentioned Information Disclosure Statements, pointing out how the instant claimed subject matter is patentably distinguishable thereover.

Isohn et al. (Category A,P in the Partial European Search Report, citing section 3.1) disclose a downlink rate matching algorithm in WCDMA for multirate and multiservice functions. The algorithm discloses that, for the coded composite transport channel

of rate less than maximum, DTX bits are inserted to match the instantaneous rate, using either fixed position or flexible position. The number of bits per frame before rate matching is determined. Then, the amount of bits to be punctured or repeated to perform rate matching is determined.

3G TS 25.212 V3.1.1 (1999-12) (Category A,D in the Partial European Search Report) is discussed at page 1, line 11 et seq. Of the present specification. The PESR cites section 4.2.7. This document discloses a formula to calculate the number of increase or decrease bits for each transport channel corresponding to the importance of the channel.

US5687095 discloses video transmission rate matching for multimedia communication systems wherein a bit stream rate matching apparatus useful in the context of a multimedia conference where a first endpoint device employs the first transmission rate and a second endpoint device employs the second transmission rate. The apparatus (1) converts a video bit stream having a first transmission rate wherein the first transmission rate is less than the second transmission rate and (2) converts a video bit stream having the second transmission rate to a video bit stream having the first transmission rate.

US6397367 discloses a channel coding device in which a bit inserter inserts known bits in an input data bit stream at

predetermined positions. A channel coder codes the bit-inserted data bit stream to generate coded symbols. A rate matcher matches a rate of the coded symbols to a given channel symbol rate. A channel interleaver interleaves the rate matched channel symbols. The rate matcher includes a puncturer for puncturing the inserted known bits included in the coded symbols, when the coded symbol rate is higher than the given channel symbol rate. The rate matcher includes a repeater for repeating the coded symbols to match the coded symbol rate to the given channel symbol rate, when the coded symbol rate is lower than the given channel symbol rate.

The Applicants recite subject matter in all claims that is not taught or suggested, alone or in combination, by the art of record.

Claim 1 recites a rate matching calculation method, comprising the steps of obtaining the number of increase or decrease bits on each channel for each frame, using data per frame on CCTrCH, the number of bits before rate matching in each TrCH to be transmitted on one frame simultaneously, and weight for each channel, according to equation (1) set forth in the specification; obtaining a rate matching parameter on the basis of the number of increase or decrease bits on each channel for each frame, wherein the number of increase or decrease bits on each channel for each frame is calculated by a corrected equation in which b/a is substituted for $b/a + 1/c^2$ in equation (1) set forth in the present specification.

Claim 2 recites a rate matching calculation method, comprising the steps of obtaining the number of increase or decrease bits on each channel for each frame, using data per frame on CCTrCH, the number of bits before rate matching in each TrCH to be transmitted on one frame simultaneously, and weight for each channel, according to equation (1) set forth in the present specification; obtaining a rate matching parameter on the basis of the number of increase or decrease bits on each channel for each frame, wherein in a case that a correct number of increase or decrease bits is not obtained by a combination of a, b and c, a predetermined number of increase or decrease bits is output.

Claim 3 recites a rate matching calculation method, comprising the steps of obtaining the number of increase or decrease bits on each channel for each frame, using data per frame on CCTrCH, the number of bits before rate matching in each TrCH to be transmitted on one frame simultaneously, and weight for each channel, according to equation (1) set forth in the present specification; obtaining a rate matching parameter on the basis of the number of increase or decrease bits on each channel for each frame, wherein the number of increase or decrease bits on each channel for each frame is obtained by calculating b×c and then dividing a result of the calculation by a.

Claim 4 depends from claim 3 and recites that, when the result of b×c exceeds 32 bits, the value of b×c is divided into upper 28 bits and lower 15 bits, a is subtracted from the upper 28 bits, "1" is set when the subtraction is enabled, while "0" is set when the subtraction is disabled, and after finishing the subtraction once, the upper 28 bits are shifted to the left by 1 bit, α is added to the lowest bit of the lower bits, and the subtraction of a and bit shift processing is performed repeatedly 17 times.

Claim 5 recites a rate matching apparatus comprising storage means for storing program data of an equation where $1/c^2$ is added to the result of b/a of equation (1) set forth in the present specification for use in obtaining the number of increase or decrease bits on each channel for each frame, using data per frame on CCTrCH, the number of bits before rate matching in each TrCH to be transmitted on one frame simultaneously, and weight for each channel; calculating means for calculating the number of increase or decrease bits on each channel for each frame according to the program data stored in the storage means; and rate matching calculating means for calculating a rate matching parameter on the basis of the number of increase or decrease bits on each channel for each frame obtained by the calculating means.

Claim 6 recites a rate matching apparatus comprising first storage means for storing program data of an equation where $1/c^2$ is

added to the result of b/a of equation (1) set forth in the present specification for use in obtaining the number of increase or decrease bits on each channel for each frame, using data per frame on CCTrCH, the number of bits before rate matching in each TrCH to be transmitted on one frame simultaneously, and weight for each channel; calculating means for calculating the number of increase or decrease bits on each channel for each frame according to the program data stored in the first storage means; second storage means for storing a combination of a, b and c where a result calculated by the calculating means is not a correct calculation result, and the correct calculation result in the combination; outputting means for outputting combination stored in the second storage means substituting for the number of increase or decrease bits from the calculating means, in a case that a combination of a, b and c in inputting a, b and c is stored in the second storage means; and rate matching calculating means for calculating a rate matching parameter on the basis of either of the number of increase or decrease bits on each channel from the calculating means or the outputting means.

Claim 7 recites a rate matching apparatus comprising storage means for storing program data of equation (1) set forth in the present specification for use in obtaining the number of increase or decrease bits on each channel for each frame, using data per

frame on CCTrCH, the number of bits before rate matching in each TrCH to be transmitted on one frame simultaneously, and weight for each channel; and calculating means for in the equation indicated by the program data stored in the storage means, first calculating b×c, then dividing the result of b×c by a, and thereby obtaining the number of increase or decrease bits on each channel for each frame.

Claim 8 depends from claim 7 and recites that, in the case where the result of b×c exceeds 32 bits, the calculating means divides a value of b×c into upper 28 bits and lower 15 bits, subtracts a from the upper 28 bits, sets "1" when the subtraction is enabled, while setting "0" when the subtraction is disabled, shifts the upper 28 bits to the left by 1 bit after finishing the subtraction once, adds a lowest bit of the lower bits to α, and repeatedly performs the subtraction of a and bit shift processing 17 times.

Claims 9, 11, 12 and 13 respectively define a base station apparatus comprising the rate matching apparatus according to any one of claims 5 to 8; and a transmission/reception apparatus which inputs a frame extracted from a received signal to the rate matching apparatus at the time of receiving signals, while further inputting a frame to be transmitted to the rate matching apparatus at the time of transmitting signals.

Claims 10, 14, 15 and 16 respectively recite a mobile station apparatus comprising the rate matching apparatus according to any one of claims 5 to 8; and a transmission/reception apparatus which inputs a frame extracted from a received signal to the rate matching apparatus at the time of receiving signals, while further inputting a frame to be transmitted to the rate matching apparatus at the time of transmitting signals.

Claim 17 recites a CDMA transmission data generating method, comprising the steps of (a) obtaining a rate-matching parameter on the basis of the number of increase or decrease bits on each channel for each transmission frame by multiplying b with c and then dividing the result of the multiplying by a, in which a, b, and c are defined by equation (1) set forth in the present specification; and (b) rate-matching the each channel based on the rate matching parameter.

Claim 18 depends from claim 17 and further recites the steps of multiplexing the each rate-matched channel to generate frame data matching frame length; and interleaving the frame data to generate the transmission frame.

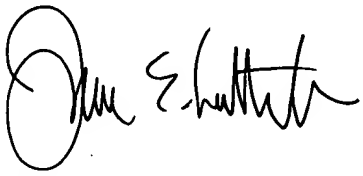
The references cited above, either alone or in combination, fail to disclose or suggest the above-discussed claimed combination of features. For example, the combined teachings of the art do not render obvious the subject matter in claim 17 of obtaining a rate-

matching parameter on the basis of the number of increase or decrease bits on each channel for each transmission frame by multiplying b with c and then dividing the result of the multiplying by a, in which a, b, and c are defined by equation (1).

Applicants submit that the references discussed herein, considered alone or in combination, fail to disclose or suggest the claimed subject matter. Therefore, in light of the foregoing discussion pointing out the claimed subject matter that distinguishes over these references, Applicants respectfully submit that the inventions of the present claims are not anticipated by these references and would not have been obvious over any combination thereof.

Grant of special status in accordance with this petition is respectfully requested.

Respectfully submitted,



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